

REMARKS

Applicants respectfully request further examination and reconsideration in view of the above amendments and the comments set forth fully below. Claims 1-69 were pending. Within the Office Action, Claims 1-69 have been rejected. By the above amendment, Claims 1, 3-6, 13-15, 17, 19-21, 27-29, 31-34 and 41-43 have been amended. Accordingly, Claims 1-69 are now pending.

Rejections Under 35 U.S.C. § 102

Within the Office Action, Claims 1-69 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,314,071 to Christian et al. (hereinafter referred to as "Christian"). Christian teaches a glass sorter including an opaque sorter 16, a green sorter 17 and a brown sorter 18. [Christian, col. 1, lines 46-49, Figures 1 and 2] Christian teaches that the opaque sorter 16 comprises a first conveyor 21, the green sorter 17 comprises a second conveyor 27 and the brown sorter 18 comprises a third conveyor 33. [Christian, col. 1, line 50 - col. 2, line 4, Figure 2] The first conveyor 21 directs glass between the first lamp array 22 and the first sensor array 23 and the first ejector array 24 ejects opaque materials from the path of flow. [Christian, col. 3, lines 2-10, Figure 2] Material not ejected by the first ejector array 24 falls on the second conveyor 27. [Christian, col. 3, lines 10-14, Figure 2] The second conveyor 27 directs glass between the second lamp array 28 and the second sensor array 29 and the second ejector array 30 deflects green glass from the path of flow. [Christian, col. 3, lines 10-17, Figure 2] Material not ejected by the second ejector array 30 falls on the third conveyor 33. [Christian, col. 3, lines 14-21, Figure 2] The third conveyor 33 directs glass between the third lamp array 34 and the third sensor array 35 and the third ejector array deflects brown glass out of the flow while the remaining clear glass falls into a clear glass area. [Christian, col. 3, lines 21-25, Figure 2] Christian therefore teaches that each ejector array 24, 30, 36 deflects one stream of glass from the main flow. Christian does not teach that one or more of the ejector arrays sorts different colored objects into more than two output feeds.

In contrast to the teachings of Christian, the method and apparatus for multi-stage sorting of glass cullets of the present invention includes a plurality of sorting devices which sort different colored objects based on their light transmission properties into more than two output feeds, wherein at least one output feed is a subsequent input feed to one or more sorting devices in the plurality. The one or more sorting devices sort the at least one subsequent input feed into a plurality of further sorted output feeds. At least one of the plurality of sorting devices is a final

sorting device, wherein the final sorting device sorts one or more subsequent input feeds into a plurality of final output feeds. As described above, Christian does not teach that one or more of the ejector arrays sort different colored objects into more than two output feeds.

The independent Claim 1 is directed to a system for sorting a mixed stream of different colored objects into separate groups of same colored objects. The system of Claim 1 comprises a plurality of sorting devices each for receiving an input feed of different colored objects and sorting the different colored objects into a plurality of output feeds, wherein at least one output feed in the plurality of output feeds is a subsequent input feed to one or more sorting devices in the plurality and further wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. As described above, Christian does not teach that at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. For at least these reasons, the independent Claim 1 is allowable over the teachings of Christian.

Claims 2-14 are dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable over the teachings of Christian. Accordingly, Claims 2-14 are all also allowable as being dependent on an allowable base claim.

The independent Claim 15 is directed to a method of effectively sorting a group of different colored objects into separate groups of similar colored objects. The method of Claim 15 comprises receiving an input feed having a plurality of objects and sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. As described above, Christian does not teach sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. For at least these reasons, the independent Claim 15 is allowable over the teachings of Christian.

Claims 16-28 are dependent on the independent Claim 15. As discussed above, the independent Claim 15 is allowable over the teachings of Christian. Accordingly, Claims 16-28 are all also allowable as being dependent on an allowable base claim.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As

described above, Christian does not teach a sorting device that separates the received objects into two or more output feeds. For at least these reasons, the independent Claim 29 is allowable over the teachings of Christian.

Claims 30-42 are dependent on the independent Claim 29. As discussed above, the independent Claim 29 is allowable over the teachings of Christian. Accordingly, Claims 30-42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 43 is directed to a multi-level sorting system for separating different colored cullets into cullets having substantially similar color characteristics. The system of Claim 43 comprises a first means for sorting the cullets, wherein the first means for sorting directs the sorted cullets into more than two first output paths, a second means for further sorting at least one received first output path, wherein the second means for sorting directs the further sorted cullets into more than two second output paths and a third means for subsequently sorting at least one received first output path and at least one received second output path, wherein the third means for sorting directs the subsequently sorted cullets into more than two third output paths. As described above, Christian does not teach a multi-level sorting system comprising first, second and third means for sorting cullets into more than two output paths. For at least these reasons, the independent Claim 43 is allowable over the teachings of Christian.

The independent Claim 44 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first output path, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths and a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first output path and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Christian does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter. Further, Christian does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Christian.

Claims 45-56 are dependent on the independent Claim 44. As discussed above, the independent Claim 44 is allowable over the teachings of Christian. Accordingly, Claims 45-56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths and a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Christian does not teach a plurality of first stage tri-sorters, a second stage tri-sorter and a third stage tri-sorter. Further, Christian does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Christian does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Christian.

Claims 58-69 are dependent on the independent Claim 57. As discussed above, the independent Claim 57 is allowable over the teachings of Christian. Accordingly, Claims 58-69 are all also allowable as being dependent on an allowable base claim.

Within the Office Action, Claims 1-11, 13-24, 26-38, 40-53, 55-66, 68 and 69 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,894,938 to Ichise et al. (hereinafter referred to as "Ichise"). Ichise teaches a glass cullet separation apparatus. The system of Ichise includes a single conveyor belt 17 to convey a single stream of cullet delivered from the rotary feeder 6. [Ichise, col. 10, lines 28-34, Figure 1] Ichise teaches a color discrimination device 41 for discriminating and determining a color of the passing cullet upon a signal from the color discrimination camera 39. [Ichise, col. 12, lines 22-65, Figure 1] Ichise teaches that the cullets are then blown into respective collection bins from the single stream of cullet. [Ichise, col. 12, line 66 - col. 13, line 52, Figure 1] Ichise does not teach multi-stage

sorting as claimed in the present application. Further, Ichise does not teach that one or more of the air nozzles sorts different colored objects into more than two output feeds.

In contrast to the teachings of Ichise, the method and apparatus for multi-stage sorting of glass cullets of the present invention includes a plurality of sorting devices which sort different colored objects based on their light transmission properties into more than two output feeds, wherein at least one output feed is a subsequent input feed to one or more sorting devices in the plurality. The one or more sorting devices sort the at least one subsequent input feed into a plurality of further sorted output feeds. At least one of the plurality of sorting devices is a final sorting device, wherein the final sorting device sorts one or more subsequent input feeds into a plurality of final output feeds. As described above, Ichise does not teach multi-stage sorting as claimed in the present application. Further, Ichise does not teach that one or more of the air nozzles sort different colored objects into more than two output feeds.

The independent Claim 1 is directed to a system for sorting a mixed stream of different colored objects into separate groups of same colored objects. The system of Claim 1 comprises a plurality of sorting devices each for receiving an input feed of different colored objects and sorting the different colored objects into a plurality of output feeds, wherein at least one output feed in the plurality of output feeds is a subsequent input feed to one or more sorting devices in the plurality and further wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. As described above, Ichise does not teach that at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. For at least these reasons, the independent Claim 1 is allowable over the teachings of Ichise.

Claims 2-11, 13 and 14 are dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable over the teachings of Ichise. Accordingly, Claims 2-11, 13 and 14 are all also allowable as being dependent on an allowable base claim.

The independent Claim 15 is directed to a method of effectively sorting a group of different colored objects into separate groups of similar colored objects. The method of Claim 15 comprises receiving an input feed having a plurality of objects and sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. As described above, Ichise does not teach sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. For at least these reasons, the independent Claim 15 is allowable over the teachings of Ichise.

Claims 16-24 and 26-28 are dependent on the independent Claim 15. As discussed above, the independent Claim 15 is allowable over the teachings of Ichise. Accordingly, Claims 16-24 and 26-28 are all also allowable as being dependent on an allowable base claim.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As described above, Ichise does not teach a sorting device that separates the received objects into two or more output feeds. For at least these reasons, the independent Claim 29 is allowable over the teachings of Ichise.

Claims 30-38 and 40-42 are dependent on the independent Claim 29. As discussed above, the independent Claim 29 is allowable over the teachings of Ichise. Accordingly, Claims 30-38 and 40-42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 43 is directed to a multi-level sorting system for separating different colored cullets into cullets having substantially similar color characteristics. The system of Claim 43 comprises a first means for sorting the cullets, wherein the first means for sorting directs the sorted cullets into more than two first output paths, a second means for further sorting at least one received first output path, wherein the second means for sorting directs the further sorted cullets into more than two second output paths and a third means for subsequently sorting at least one received first output path and at least one received second output path, wherein the third means for sorting directs the subsequently sorted cullets into more than two third output paths. As described above, Ichise does not teach a multi-level sorting system comprising first, second and third means for sorting cullets into more than two output paths. For at least these reasons, the independent Claim 43 is allowable over the teachings of Ichise.

The independent Claim 44 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first output path, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second

output paths and a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first output path and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Ichise does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter. Further, Ichise does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Ichise.

Claims 45-53, 55 and 56 are dependent on the independent Claim 44. As discussed above, the independent Claim 44 is allowable over the teachings of Ichise. Accordingly, Claims 45-53, 55 and 56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths and a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Ichise does not teach a plurality of first stage tri-sorters, a second stage tri-sorter and a third stage tri-sorter. Further, Ichise does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Ichise does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Ichise.

Claims 58-66, 68 and 69 are dependent on the independent Claim 57. As discussed above, the independent Claim 57 is allowable over the teachings of Ichise. Accordingly, Claims 58-66, 68 and 69 are all also allowable as being dependent on an allowable base claim.

Within the Office Action, Claims 1-7, 9, 14-21, 28-35, 42-45, 48, 51, 56-58, 61, 64 and 69 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No.

5,314,072 to Frankel et al. (hereinafter referred to as "Frankel"). Frankel teaches sorting plastic bottles for recycling. Frankel teaches a main conveyor which moves plastic bottles in a longitudinal direction. [Frankel, col. 6, line 67 - col. 7, line 8, Figure 1] Frankel teaches a variety of sensing areas connected in series which each sensing area associated with a single ejector. [Frankel, col. 7, lines 8-34, Figure 1] Frankel does not teach multi-stage sorting as claimed in the present application. Further, Frankel does not teach that one or more of the ejectors sorts different colored objects into more than two output feeds. Frankel teaches a single ejector associated with each sensing area.

In contrast to the teachings of Frankel, the method and apparatus for multi-stage sorting of glass cullets of the present invention includes a plurality of sorting devices which sort different colored objects based on their light transmission properties into more than two output feeds, wherein at least one output feed is a subsequent input feed to one or more sorting devices in the plurality. The one or more sorting devices sort the at least one subsequent input feed into a plurality of further sorted output feeds. At least one of the plurality of sorting devices is a final sorting device, wherein the final sorting device sorts one or more subsequent input feeds into a plurality of final output feeds. As described above, Frankel does not teach multi-stage sorting as claimed in the present application. Further, Frankel does not teach that one or more of the ejectors sort different colored objects into more than two output feeds. Frankel teaches a single ejector associated with each sensing area.

The independent Claim 1 is directed to a system for sorting a mixed stream of different colored objects into separate groups of same colored objects. The system of Claim 1 comprises a plurality of sorting devices each for receiving an input feed of different colored objects and sorting the different colored objects into a plurality of output feeds, wherein at least one output feed in the plurality of output feeds is a subsequent input feed to one or more sorting devices in the plurality and further wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. As described above, Frankel does not teach that at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. Frankel teaches a single ejector associated with each sensing area. For at least these reasons, the independent Claim 1 is allowable over the teachings of Frankel.

Claims 2-7, 9 and 14 are dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable over the teachings of Frankel. Accordingly, Claims 2-7, 9 and 14 are all also allowable as being dependent on an allowable base claim.

The independent Claim 15 is directed to a method of effectively sorting a group of different colored objects into separate groups of similar colored objects. The method of Claim

15 comprises receiving an input feed having a plurality of objects and sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. As described above, Frankel does not teach sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. Frankel teaches a single ejector associated with each sensing area. For at least these reasons, the independent Claim 15 is allowable over the teachings of Frankel.

Claims 16-21 and 28 are dependent on the independent Claim 15. As discussed above, the independent Claim 15 is allowable over the teachings of Frankel. Accordingly, Claims 16-21 and 28 are all also allowable as being dependent on an allowable base claim.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As described above, Frankel does not teach a sorting device that separates the received objects into two or more output feeds. Frankel teaches a single ejector associated with each sensing area. For at least these reasons, the independent Claim 29 is allowable over the teachings of Frankel.

Claims 30-35 and 42 are dependent on the independent Claim 29. As discussed above, the independent Claim 29 is allowable over the teachings of Frankel. Accordingly, Claims 30-35 and 42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 43 is directed to a multi-level sorting system for separating different colored cullets into cullets having substantially similar color characteristics. The system of Claim 43 comprises a first means for sorting the cullets, wherein the first means for sorting directs the sorted cullets into more than two first output paths, a second means for further sorting at least one received first output path, wherein the second means for sorting directs the further sorted cullets into more than two second output paths and a third means for subsequently sorting at least one received first output path and at least one received second output path, wherein the third means for sorting directs the subsequently sorted cullets into more than two third output paths. As described above, Frankel does not teach a multi-level sorting system comprising first, second and third means for sorting cullets into more than two output paths. Frankel teaches a single ejector associated with each sensing area. For at least these reasons, the independent Claim 43 is allowable over the teachings of Frankel.

The independent Claim 44 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first output path, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths and a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first output path and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Frankel does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter. Further, Frankel does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Frankel.

Claims 45, 48, 51 and 56 are dependent on the independent Claim 44. As discussed above, the independent Claim 44 is allowable over the teachings of Frankel. Accordingly, Claims 45, 48, 51 and 56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths and a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. Frankel does not teach a plurality of first stage tri-sorters; a second stage tri-sorter and a third stage tri-sorter. Further, Frankel does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Frankel does not teach a third stage tri-sorter which sorts cullets received in output paths

from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Frankel.

Claims 58, 61, 64 and 69 are dependent on the independent Claim 57. As discussed above, the independent Claim 57 is allowable over the teachings of Frankel. Accordingly, Claims 58, 61, 64 and 69 are all also allowable as being dependent on an allowable base claim.

Should the Examiner have any questions or comments, they are encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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CERTIFICATE OF MAILING (37 CFR § 1.8(a))

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